

Prosodic Matching and Turn Competition in Multi-Party Conversations



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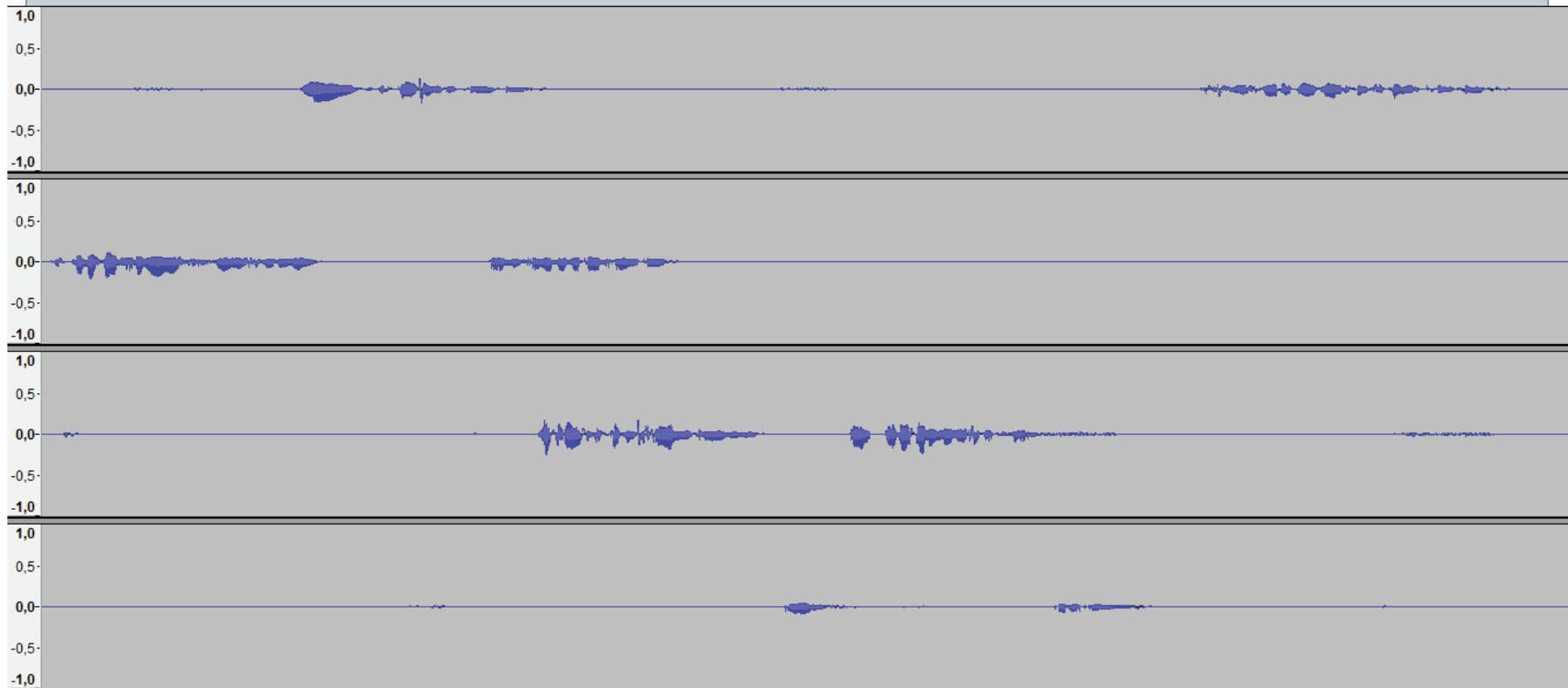
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Overlapping talk example

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Outline

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BACKGROUND

MATERIAL & METHOD

RESULTS

DISCUSSION & CONCLUSIONS

Background

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Competitiveness in overlapping speech

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- Overlapping talk occurs frequently in conversation
- Systematically analysed (French & Local, 1983; Kurtić et al., 2013)
 - Classification into competitive and non-competitive overlap
 - ✦ CA (Conversation Analysis)
 - Sequencing
 - Treatment by participants
 - Prosodic constructions of competitiveness
 - ✦ impressionistic
 - ✦ Automatic
 - Feature extraction
 - Classification

Prosody in Conversation

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individual prosody	coordinated prosody across participants
<ul style="list-style-type: none">• single speaker, single turn: e.g. specific pitch → specific actions• within speaker coordination: e.g. increase in pitch → specific actions	<ul style="list-style-type: none">convergence (Kousidis et al. 2008)entrainment (Levitan et al., 2011)repetition / shadowing (Tannen, 1987)mirroring, synchronization (Lee et al. 2010)matching / non-matching (Szczepek-Reed, 2006)

- Pitch contour matching co-occurs with interactional alignment (Gorisch et al. 2012)
 - Current speaker continues if the second speaker matches the pitch contour
 - ✦ e.g. with a response token (“uh huh”)

Research Questions

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- RQ1: How is competitiveness in overlaps organised prosodically?
 - Replication attempt of Kurtić et al. (2013)
 - ✦ Expect similar results
- RQ2: Is there a link between competitiveness in overlap and interactional alignment?
 - We know: interactional alignment is performed with matching
 - ✦ competitive overlaps → non-matching prosody
 - ✦ non-competitive overlaps → matching prosody

Material & Method

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Corpus

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- **Recordings (Kurtić et al., 2012)**
 - 2 hours
 - multi-party (four friends)
 - face-to-face
 - conversations
 - British English
- **Segmented manually into Turn Constructional Units (TCUs) (Sacks et al. 1974)**
- **Detected automatically overlap instances**
 - start and end time of TCUs
- **Selection**
 - Only two-speaker overlaps
 - 3092 instances



CA annotation

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- Definition of turn competition:
 - *An instance of overlapping speech is competitive if either party, overlappee or overlapper, or both demonstrates the aim to prevent the other party from either keeping or taking over the current turn.*
- Annotators' decision:
 - Level of competitiveness (1-to-5 scale)
 - ✦ 1= totally non-competitive
 - ✦ 5=totally competitive
- Two annotators
 - Same experience in conversation analysis
 - Annotators agreed in 2012 out of 3044 instances (66.1%) on either “1” or “5”.

Method

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- Automatic classification
 - Data
 - ✦ Instances where both annotators agreed
 - ✦ 52 extracted and annotated features
 - Decision Trees using the Weka toolkit
 - ✦ Machine learning technique
 - ✦ Inspection of trees can give indications on how the features are used for classification decisions
 - ✦ Performance evaluated using Cohen's Kappa (Japkowicz & Shah, 2011)

Features

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- Manually annotated feature

- Position: Where in the TCU does the overlap start? (following Kurtić, 2011)
 - ✦ 6 positions: simultaneous start, terminal, blind spot, mid-turn, recognitional, progressional

- Extracted features

- Extraction at 3 Locations
 - ✦ (1) overlappEr in overlap
 - ✦ (2) overlappEe in overlap
 - ✦ (3) overlappEe before overlap
- Duration
- Periodicity/Aperiodicity
 - ✦ average aperiodicity
 - ✦ NaN-ratio (between valid and missing Fo values)
- Fo features
 - ✦ 6 pitch features: slope, minimum, maximum, standard deviation, span, height
- Speaker
 - ✦ overlappEe
 - ✦ overlappEr

Ee: before -- before -- before -- in overlap

(3)

(2)

(1)

Er:

in overlap

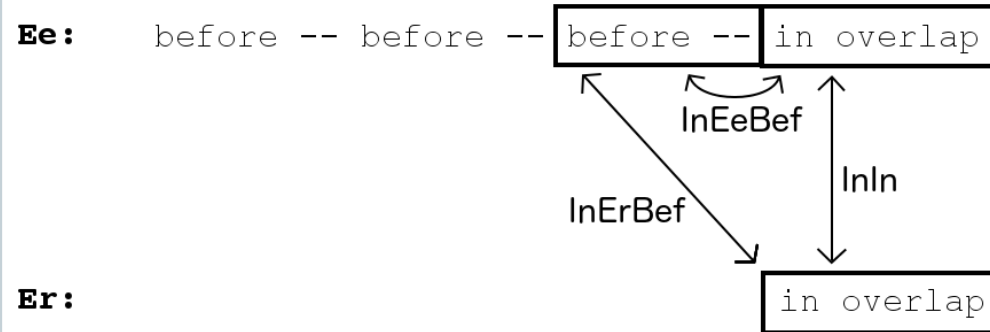
“coordinated” features

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- Comparison across participants

- Measure in three contexts

- ✦ InIn
 - ✦ InErBef
 - ✦ InEeBef



- absolute differences, e.g.: $|\text{slope}_{Ee} - \text{slope}_{Er}|$
 - pitch contour similarity: “simScore” (Gorisch et al. 2012)

Results

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RQ1: classification of competitiveness

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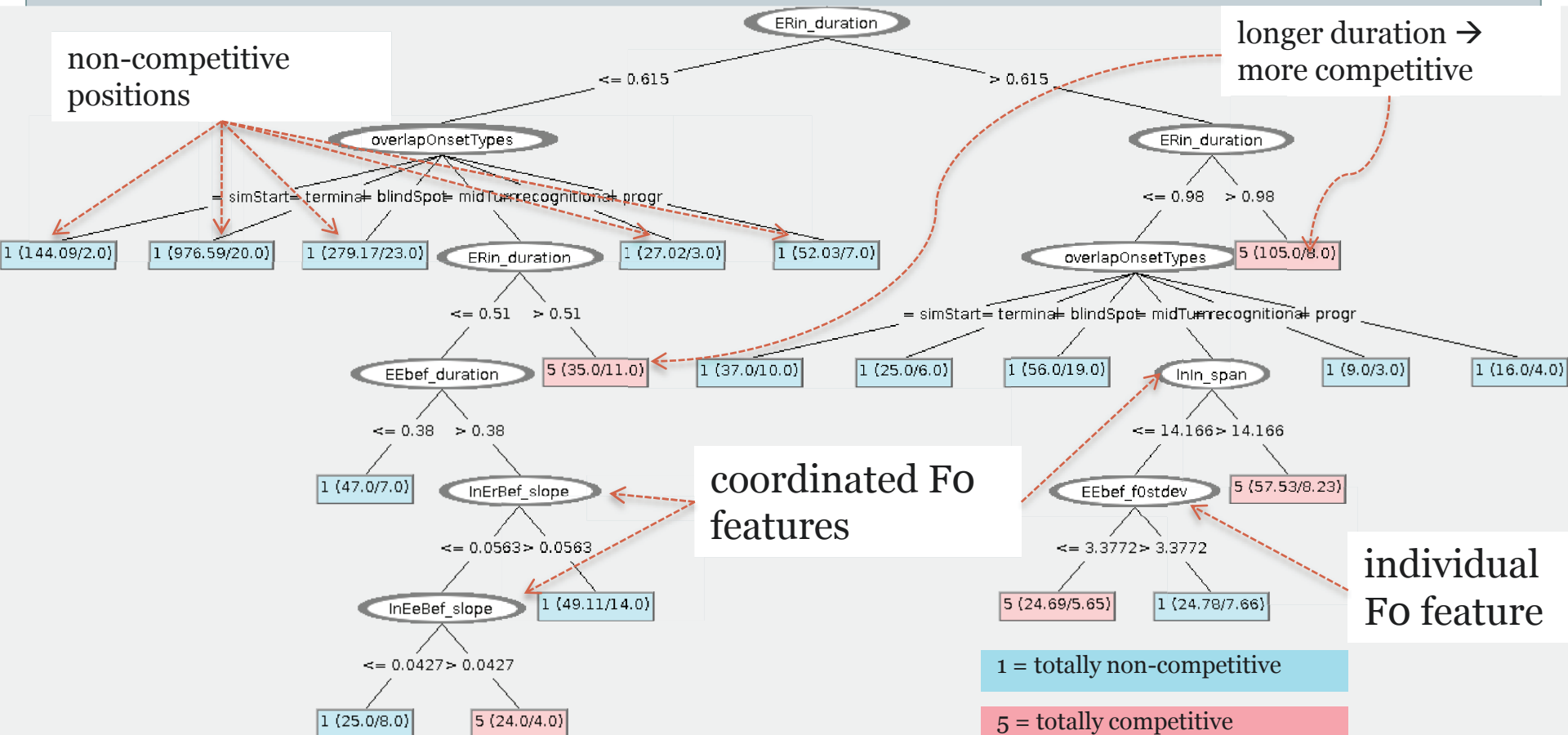
Feature set	# features in set	Cohen's kappa	
Duration	3	0.50	Duration and Position features add more than Fo when used alone
F0	45	0.35	
Positional	1	0.51	
Speaker	2	0.00	irrelevant who the features overlap or OverlappEr are 1, the Kappa decreases
Duration + F0	48	0.46	
Duration + Positional	4	0.56*	
F0 + Positional	46	0.45	
Duration + Speaker	5	0.50	
F0 + Speaker	47	0.32	best classifier: moderate agreement with human annotators
Positional + Speaker	3	0.51	
All	52	0.57	

* indicates: not significantly different from the best classifier (All)

Decision Tree – all features

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support Kurtic et al. (2013):
position and duration: more decisive than Fo



contradicts Kurtic et al. (2013)
(RQ2) Coordinated features more
decisive than individual features

(RQ2) Pitch contour matching and non-matching is
not used as interactional resource for competition

Overlapping talk example

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duration



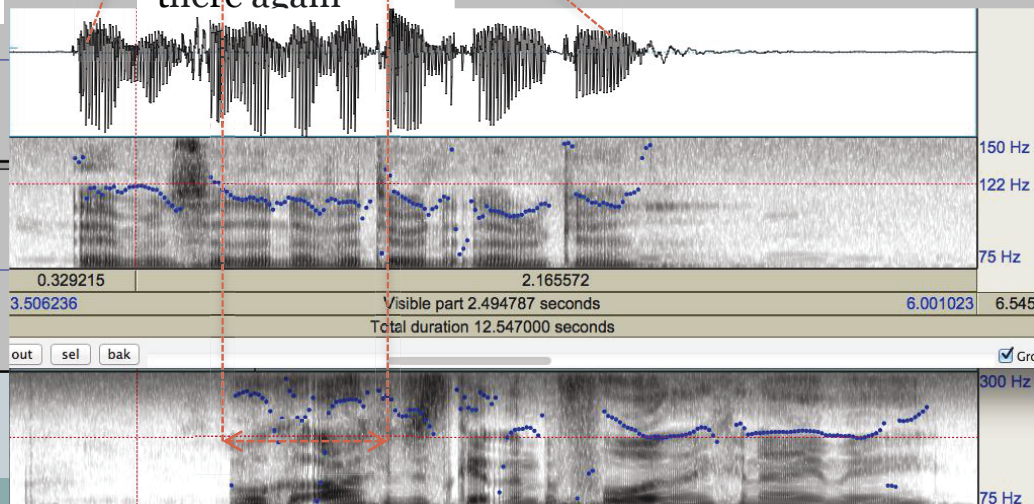
Position overlap onset

no it's gonna be
in DQ isn't it

I don't know how they're
gonna do it's really strange
concept

it's they're not doing it
anywhere else i* where
else again are they

Amy said they
never do it in
there again



Similarities and differences to Kurtić et al. (2013)

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Similarities

overlap placement > prosodic features
longer overlap -> more competitive

Differences

Kurtić et al. (2013)	current study
Competition can be initiated at any point	Competition is classified mainly at mid-turn position
individual Fo and intensity features: more decisive than coordinated features	coordinated features: more decisive in Fo than individual Fo features (intensity not measured)

Discussion & Conclusions

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Discussion

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- RQ1 (prosodic organisation of competitiveness?)
 - Long overlap duration
 - ✦ if people continue speaking in overlap => competitive
 - supports findings by Kurtić et al. (2013)

Conclusions – is there some ‘ecosystem’?

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- If there is an ecosystem,
 - lexicon of constructions linked to interactional meaning
 - often claimed in the literature (e.g. rising intonation “means” a question)
 - but: many counterexamples when we consider real interaction
- It may be there is no ecosystem, no lexicon.

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Potential explanation for differences in results

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Kurtic et al. 2013	current study
excluded: choral productions, collaborative completions, continuers/response tokens	all instances of overlap
134 features	52 features
ICSI meeting corpus	4 friends having a conversation

Overlapping talk example

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duration

Position overlap onset

no it's gonna be
in DQ isn't it

I don't know how they're
gonna do it's really strange
concept

it's they're not doing it
anywhere else i* where
else again are they

Amy said they
never do it in
there again

well c* I can just get
them before and
they can owe me

wha* are they
selling normal
tickets as well

oh

I don't
know

